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The Presuppositions of Soft Triggers are not Presuppositions*

Jacopo Romoli
Harvard University

Abstract Presupposition triggers can be divided in two groups on the basis of whether the presuppositions they give rise to are easily defeasible or not. Abusch (2002) calls these two groups “soft” and “hard” triggers. In this paper I argue that the “presuppositions of soft triggers” is a label that actually identifies meaning components that sometimes arise as plain entailments and sometimes as scalar implicatures. I propose a way to derive them based only on alternatives and an independently justified theory of scalar implicatures. This will be able to explain how and when these inferences can be suspended, while also accounting for the “regular” projection behavior when they are not suspended. Furthermore, the proposed system will also account for puzzling cases arising from the interaction between the presupposition of soft triggers and scalar implicatures.

Keywords: Presuppositions, Soft Triggers, Scalar Implicatures

1 Introduction

A much discussed topic in the presupposition literature is the fact that the presuppositions of some triggers appear to be more context dependent and more easily defeasible than others (Karttunen 1971, Stalnaker 1974, Chierchia & McConnell-Ginet 2000, Simons 2001, Abusch 2002, 2010, Abbott 2006 and Klinedinst 2010). Abusch (2002) introduces the terminology “soft” and “hard triggers” to distinguish these two classes. A paradigmatic example of a soft trigger is *win*, whereas an example of a hard one is *it*-clefts.¹

(1) Bill won the marathon. \rightsquigarrow Bill participated in the marathon.

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¹ In the following I will use “ \Rightarrow ” to indicate entailments, appropriately generalized where needed, and “ \rightsquigarrow ” to indicate more neutrally an inference.

- (2) It is Mary who broke that computer. \leadsto Somebody broke that computer.

Arguably the best way to distinguish between soft and hard triggers is by creating a context in which the speaker is evidently ignorant about the presupposition; triggers that do not give rise to infelicity in such contexts are soft triggers. Consider the following two examples modeled from [Abusch \(2010\)](#) that show that according to this diagnostic *win* and *it*-clefts are indeed soft and hard triggers respectively.²

- (3) I don't know whether Bill ended up participating in the Marathon yesterday. But if he won he is certainly celebrating right now.
- (4) I don't know whether anybody broke that computer. #But if it is Mary who did it, she should repair it

In the following I will propose that the presupposition of soft triggers ("soft presuppositions" henceforth) is a label that identifies inferences that are sometimes entailments and sometimes scalar implicatures. This might seem a very exotic category, but it is just a way of describing very ordinary inferences like the ones in (5a) and (5b).

- (5) a. Every student came. \Rightarrow Some student came.
b. Not every student came. \leadsto Some student came.

In fact, one way to describe these inferences is by treating them as one single inference, which has the status of entailment in some cases and of a scalar implicature in others. I will call the type of inferences that include both (5a) and (5b) "entailments that are also alternatives".³ The name reflects the fact that the inference in (5a)/(5b) is generally accounted for by postulating a set of alternatives which includes *every* and *some*, where the former is stronger than the latter. As we will see below, together with a theory of scalar implicatures this predicts the inference above, as a plain entailment in (5a) and as a scalar implicature in (5b).⁴

In the following, I will propose that soft presuppositions are to be accounted for in the same way as the inferences in (5a)/(5b); in the terminology above, they

² Notice that the speaker does not need to say explicitly that she is ignorant about the presupposition; the common presumption that she is can be enough. Consider the following example in (1) (from [Geurts 1995](#) reported in [Simons 2001](#)).

(1) Context: *conversations between two people who are meeting for the first time*
I noticed that you keep chewing on your pencil. Have you recently stopped smoking?

In (1) the presupposition of *stop*, i.e. that the addressee used to smoke, is clearly not present.

³ Thanks to Danny Fox (p.c.) for suggesting this terminology.

⁴ These kinds of scalar implicatures arising from the strongest element of the scale have been called "indirect scalar implicatures" by [Chierchia \(2004\)](#) and "negative implicatures" by [Chemla \(2009\)](#).

are entailments that are also alternatives of soft triggers. As I will show, this allows an account of soft presuppositions simply based on a theory of scalar implicatures and it will predict the differences and similarities with hard presuppositions on one side and scalar implicatures on the other. It will also provide an account of some puzzling cases involving the interaction between soft presuppositions and scalar implicatures.⁵

The rest of the paper is organized as follows: in the remainder of this section, I will discuss the soft-hard distinction, also in relation to scalar implicatures. In section 2 I will outline the main ingredients of the proposal. In section 3 I will talk about the predictions that it makes with respect to the defeasibility and projection of soft presuppositions. In section 4 I will talk about the further predictions on the interactions between soft presuppositions and “regular” scalar implicatures.

1.1 Motivating the Account

1.1.1 The Traditional Distinction: Presuppositions versus Scalar Implicatures

Presuppositions and scalar implicatures are traditionally distinguished along at least two dimensions: defeasibility in unembedded contexts and projection out of embeddings (see for instance [Beaver & Geurts to appear](#)). Let’s review both properties in turn.⁶

Presuppositions, both soft and hard, are not defeasible in unembedded contexts ([6a,6b](#)) while scalar implicatures are ([6c](#)).

- (6) a. It is Mary who broke that computer and #in fact, maybe nobody broke it.
- b. John won the marathon #and in fact, he might have not participated.
- c. John went to Italy or France and in fact, he may have gone to both.

Furthermore, it is taken to be a characteristic behavior of presuppositions, again both soft and hard, that they project out of embeddings, a property that is not generally attributed to scalar implicatures. To illustrate this, consider what happens if we

⁵ The gist of this proposal is similar to [Chemla’s \(2008\)](#), [Chemla’s \(2010\)](#) and in a different way to [Chierchia’s \(2010b\)](#). The main difference from the first two proposals is its being a theory of soft triggers only and not of all presuppositional triggers in general. In fact it is developed as a theory that explains the differences between soft and hard triggers. The main difference with [Chierchia’s \(2010b\)](#) proposal is that it is a theory entirely based on regular scalar implicatures.

⁶ A further difference between presuppositions and scalar implicatures regards the discourse status: presuppositions are generally felt to be taken for granted or backgrounded in the context at the moment of utterance of the presupposing sentence. I will not discuss this property here because of space limitations. However, there are ways to integrate a mechanism of backgrounding in a system like the one proposed here, see [Chemla 2010](#) for some suggestions and discussion.

embed the sentences above under negation and polar questions, environments which presuppositions typically escape. Both (7a) and (7b) have the same presuppositions as their embedded sentences, while (7c) does not.⁷

- (7) a. It isn't Mary who broke that computer. \rightsquigarrow Somebody broke that computer.
b. John didn't win the marathon. \rightsquigarrow John participated in the marathon.
c. John didn't go to Italy or France. NO IMPLICATURE

Similarly for polar questions: both (8a) and (8b) have the presuppositions of their embedded sentences, while (8c) again does not have the same scalar implicature of the sentence embedded in it.

- (8) a. Is it Mary that broke that computer? \rightsquigarrow Somebody broke that computer.
b. Did John win the marathon? \rightsquigarrow John participated in the marathon.
c. Did John go to Italy or France? NO IMPLICATURE

My account in terms of entailments as alternatives will respect these data which have led others to group soft and hard presuppositions together and contrast them with implicatures, while also explaining the differences between soft and hard presuppositions.

1.1.2 The Distinction within Presuppositions: Soft versus Hard Triggers

Other embeddings furnish further cases in which hard and soft presuppositions behave in the same way. For instance, in the following cases they both seem to project out of disjunctions (9a and 10a) and conditionals (11a and 12a).

- (9) a. Mary was out of town or it was her who broke that computer.
b. \rightsquigarrow Somebody broke that computer.
(10) a. John was sick or he won the marathon yesterday.
b. \rightsquigarrow John participated in the marathon yesterday.
(11) a. If Mary wasn't out of town, it was her who broke that computer.
b. \rightsquigarrow Somebody broke that computer.
(12) a. If John wasn't sick, he won the marathon yesterday.

⁷ Notice that the proposition that John didn't go to both Italy and France is an entailment of (7c). One could take this fact just as a potential confound of the diagnostic for presupposition projection (Beaver 2001) or something that weakens the difference between presupposition and scalar implicatures (Chemla 2008). As we will see below, this fact will be crucial in accounting for certain cases of projection of soft presuppositions. As I am just reviewing the traditional distinction here I will just observe that no implicature is generally postulated in these cases.

- b. \leadsto John participated in the marathon yesterday.

However, there are also similar cases like (13) and (14) in which soft and hard presuppositions pattern differently. One way to describe the pattern is that soft presuppositions can be suspended when embedded, while hard presuppositions cannot.

- (13) a. I don't know whether anybody broke that computer. #But either it wasn't Mary who did it or Bill is covering up for her.
 b. I have no idea whether John ended up participating in the Boston Marathon. But either he didn't win or he is upset for something else.
- (14) a. I don't know whether anybody broke that computer. #But if it is Mary who did it, Bill is covering up for her
 b. I don't know whether John participated in the Boston Marathon. But if he won, he is certainly celebrating right now

So, soft and hard presuppositions seem to pattern alike for many cases of projection and defeasibility in *unembedded* contexts. On the other hand, they differ in defeasibility when embedded. We need a theory of soft presuppositions that is able to account both for the similarities with and the differences from hard ones. Let's turn now to the proposal.

2 Towards a Unified Account of Soft Presuppositions and Scalar Implicatures

As already mentioned above, the idea is simply the following: soft presuppositions are "entailments that are also alternatives". Let's now see what this means in more detail.

2.1 Alternatives

I submit that soft triggers are associated with scalar lexical alternatives of a sort and they are the strongest element of such scales. Such scalar alternatives are a systematically characterized subset of their lexical entailments. So for instance, the sentences with soft triggers like the ones in (a) in (15-17) below end up having the sentences in (b) as (sentential) alternatives.

- (15) (a) John knows that it's raining. (b) it is raining.
 (16) (a) Mary won the race. (b) Mary participated in the race.
 (17) (a) Mary stopped smoking. (b) Mary used to smoke.

How do we characterize these subsets of the lexical entailments? In other words, why for instance isn't "John believes that it is raining" an alternative of (15)? Notice that this is the triggering problem in a different guise (i.e. where do presuppositions come from?). In fact theories of presuppositions that are based on alternatives do not automatically solve the triggering problem, rather it is just translated here as questions about the alternatives: where the alternatives come from and why those alternatives and not others. Here I will remain neutral on the details of how to do this, but let me mention that there is at least one characterization of the triggering problem that can be straightforwardly adapted to the present system as a mechanism of selection of the alternatives, which is [Abrusán's \(2011\)](#) notion of independence. Informally, her idea is that a lexical entailment of a sentence is independent from it if the event time of the former does not (have to) co-occur with that of the matrix event of the sentence. Due to space limitations I cannot discuss here the details of Abrusán's proposal, but as one can verify, her notion can systematically distinguish the entailments that I will assume are among the alternatives from the ones that are not.⁸

An easier question than the above is: once we have a criterion for characterizing the alternatives, how do we obtain them compositionally? One way is by associating soft triggers like *know* in (18a) with lexical alternatives of the same type as in (18b).⁹

- (18) a. $\llbracket \text{know} \rrbracket = \lambda p \lambda x \lambda w [\mathbf{know}_{x,w} p]$
 b. $\mathcal{Alt} = \{ \lambda p \lambda x \lambda w [\mathbf{know}_{x,w} p], \lambda p \lambda x \lambda w [p(w)] \}$

These alternatives then 'grow' with pointwise composition. For instance, in (19a), the alternatives we end up obtaining are the ones in (19b).

- (19) a. $\neg[\text{John knows that it's raining}]$
 b. $\{ \neg[\text{John knows that it's raining}] \neg[\text{it is raining}] \}$

⁸ For instance $\mathbf{know}_{x,p}$ entails $\mathbf{believe}_x[p]$ and p , but only p is independent in [Abrusán's \(2011\)](#) sense, so among the two it is the only one predicted to be among the alternatives. Nathan Klinedinst (p.c.) and Bernhard Nickel (p.c.) pointed out to me that there is a further problem here, which is explaining why the algorithm proposed above should treat certain entailments as alternatives in the case of soft triggers, and in case of hard triggers as genuine presuppositions; in other words, why soft triggers are soft triggers (see also [Abbott 2006](#) for a similar criticism of [Abusch's \(2002\)](#) system). I do not have a full answer to this problem right now, but it is worth to notice here that [Abrusán's \(2011\)](#) algorithm only applies to soft triggers, so it is expected to apply only to the triggers analyzed here. Finally, [Chierchia \(2010a\)](#) proposes to use a notion of non-causation. Here I will remain neutral on which approach to use.

⁹ This is [Chierchia's \(2010b\)](#) implementation (see also [Rooth 1992](#) and [Hamblin 1973](#)) and it is not essential to the present proposal. The present account is, in fact, compatible with different theories of alternatives, in particular with [Fox & Katzir's \(2011\)](#) theory of alternatives. Notice that both in the formulation proposed here and in their theory it remains to be accounted for which alternatives to select among the possible ones.

Notice that the alternatives of a sentence with a scalar item like *all* in (20), represented schematically in (21), can be constructed in a completely identical way.

(20) John didn't talk to all of the students.

(21) $\{\neg[\text{John talked to all of the students}], \neg[\text{John talked to some of the students}]\}$

Finally, I will also assume that these alternatives are obligatorily active, in the sense of Chierchia (2006) (see also Chierchia, Fox & Spector to appear). This means that they always need to be “exhaustified”, in a sense to be clarified in the next section.

We have almost all ingredients in place. We now just need a theory of scalar implicatures. I will turn to this now.

2.2 A Theory of Scalar Implicatures

I will adopt a theory of scalar implicatures as entailments of exhaustified sentences (Chierchia et al. to appear, Fox 2007 and Magri 2010 among others). In such a theory, it is postulated that an exhaustivity operator EXH, similar to overt *only*, applies to propositions and their associated alternatives and it affirms the proposition while negating a subset of the alternatives. The excludable alternatives are all the ones that can be consistently negated with the assertion.¹⁰

(22) $\text{EXH}(\mathcal{A}lt(p))(p)(w) = p(w) \wedge \forall q \in \mathcal{E}xcl(p, \mathcal{A}lt(p))[\neg q(w)]$

(23) $\mathcal{E}xcl(p, \mathcal{A}lt(p)) = \{q \in \mathcal{A}lt(p) : \neg q \text{ is CONSISTENT with } p\}$

Exhaustification of a sentence over the relevant alternatives gives rise to scalar implicatures.¹¹ For instance a case like (20) with the alternatives in (21) above will give rise to the scalar implicature that John talked to some of them.

(24) $\text{EXH}(\mathcal{A}lt)(\neg[\text{John talked to all of them}]) = \neg[\text{John talked to all of them}] \wedge \neg\neg[\text{John talked to some of them}] = \neg[\text{John talked to all of them}] \wedge \text{John talked to some of them}$

¹⁰ This is a simplification adopted from Magri (2011). In the general case I will adopt the independently justified notion of INNOCENTLY EXCLUDABLE alternatives, which are the ones that are EXCLUDABLE in a non arbitrary way (Fox 2007). In other words, they are all the alternatives that are in all sets that are maximal and excludable.

(1) $\mathcal{I}nn - \mathcal{E}xcl(p, \mathcal{A}lt(p)) = \bigcap \{X : X \subseteq \mathcal{A}lt(p) : \{\neg q : q \in X\} \cup \{p\} \text{ is MAXIMAL and CONSISTENT}\}$

A further and again independently justified constraint on multiple replacements is needed for other cases too; see Fox 2007 (footnote 35) and Magri 2010: 35-36 and Chemla 2010: 56 for discussion.

¹¹ More precisely in this account they are entailments of sentences with exhaustification. I will keep on using the standard terminology and call them scalar implicatures.

EXH can be inserted at any level of embeddings, but its distribution is not completely free. It is well known in particular that exhaustification below a downward entailing operator is marked and gives rise to a metalinguistic effect. So for instance (25a), typically pronounced with stress on “or”, can be treated as a case of local exhaustification, as that gives rise to a meaning compatible with the continuation that John talked to both.

- (25) a. John didn’t talk to Paul or Sue, he talked to both of them.
 b. $\neg[\text{EXH}[\text{John talked to Paul or Sue}]] = [\text{John didn’t talk to Paul or Sue}]$ or
 [he talked to both Paul and Sue]

One way to account for the markedness of (25a) is to appeal to a version of the strongest meaning hypothesis. The idea is that unless forced to by contradictions in the context, we insert EXH only if the resulting meaning is not equivalent or weaker than the one without it (Chierchia et al. to appear). This predicts that (25a) should be marked given that it violates (26).¹²

- (26) **Minimize Weakness:** Do not insert EXH in a sentence S if it leads to an equivalent or weaker meaning than S itself.

In the following I will assume that the only relevant principle constraining the distribution of EXH is (26) and show how this also can be extended to account for the data of soft presuppositions.

3 Inferences from Soft Triggers

I will now show how to derive the inferences of soft triggers. The case of the inferences in unembedded contexts is straightforward. In fact if soft triggers are the strongest elements in their scales, they entail their alternatives in unembedded contexts. This immediately predicts that they, like other entailments, are not defeasible in such contexts. Cases that arise when the soft trigger is embedded under negation or in polar questions will be similarly simple. The account for disjunction and conditionals will be slightly more complex but will rely only on the same ingredients as the other cases above.

3.1 Projection and Defeasibility in Embedded Contexts

3.1.1 Negation

Negation applied to the alternatives inverts their entailment relations. As a result, exhaustification yields the negation of the negated alternatives. So both a sentence

¹² In fact for any downward entailing operator f , exhaustification above f entails exhaustification below it: $\text{EXH}(f(p)) \Rightarrow f(\text{EXH}(p))$.

and its negation yield the same inference. In particular both (27a) and (28a) lead to the inference that it is raining.

- (27) a. John knows that it's raining.
 b. $\mathcal{A}lt = \{\text{John knows that it is raining, it is raining}\}$
 c. $\text{EXH}[\text{John knows that it is raining}] = \text{John knows that it is raining}.$
- (28) a. John doesn't know that it's raining.
 b. $\mathcal{A}lt = \{\neg[\text{John knows that it is raining}], \neg[\text{it is raining}]\}$
 c. $\text{EXH}[\neg[\text{John knows that it is raining}]] = \neg[\text{John knows that it is raining}] \wedge \neg\neg[\text{it is raining}]$

This is entirely parallel again to other entailments that are alternatives. For instance both (29c) and (30c) entail that John solved some of the problems.

- (29) a. John solved all of the problems.
 b. $\mathcal{A}lt = \{\text{John solved all of the problems, John solved some of the problems}\}$
 c. $\text{EXH}[\text{John solved all of the problems}] = \text{John solved all of the problems}.$
- (30) a. John didn't solve all of the problems.
 b. $\mathcal{A}lt = \{\neg[\text{John solved all of the problems}], \neg[\text{John solved some of the problems}]\}$
 c. $\text{EXH}[\neg[\text{John solved all of the problems}]] = \neg[\text{John solved all of the problems}] \wedge \neg\neg[\text{John solved some of the problems}]$

Notice that this is obtained when EXH has wide scope with respect to negation and notice also that given (26) above, the present system predicts that narrow scope of EXH, being vacuous, should be generally dispreferred.¹³

3.1.2 Polar Questions

I will assume that a polar question Q denotes the pair of its positive and negative answers (Hamblin (1973) among others) and also that typically a question is

¹³ This can explain why the reading in (1) is marked and requires a context that contradicts the inference that it is raining. In fact given the assumption that alternatives are always active and have to be exhaustified somewhere, (1) has to be analyzed as a case of exhaustification below negation, which gives rise to a meaning compatible with the continuation, but violates (26).

- (1) John doesn't know that it's raining because it isn't raining.
 (2) $\neg[\text{EXH}[\text{John knows that it is raining}]] = \neg[\text{it is raining}] \text{ or } \neg[\text{John knows that it is}]$

exhaustified, so that we get $\{\text{EXH}(p) : p \in Q\}$.¹⁴

Applying these assumptions to a case like (31a), we can show that they lead to the correct predictions. In fact, given the results about negation above, it is easy to see that both members of the question denotation entail that it is raining in this case.

- (31) a. Does Ann know that it is raining?
 b. $\{\text{EXH}[\text{Ann knows that it is raining}], \text{EXH}[\neg[\text{Ann knows that it is raining}]]\}$

Assuming that polar questions themselves introduce the presupposition that one of the answers is true, then the proposition that it is raining becomes an inference of the question itself.

Again this is entirely parallel to what happens with other scalar items: (32a) can give rise at least in some cases to the implication in (32b) (see Chemla 2008 for discussion).

- (32) a. Did John fail all of his students?
 b. John failed some of his students.

Let's see now the predictions for soft triggers embedded in disjunctions and conditionals.

3.2 Disjunctions and Conditionals

3.2.1 Disjunctions

Let's start from the inference exemplified in (10a) and (12a) above, in which soft presuppositions appear to simply project out and lead to the inference that John participated in the marathon. What the present system predicts here is actually the weaker conditional entailment that if he wasn't sick he participated in the marathon. It is well known in the literature that these types of conditional inferences are problematic in certain cases but more plausible in others. This is known as the "proviso problem" (Geurts 1999) and there are various accounts in the literature, which derive the non-conditional inference from or in addition to the conditional one (Perez-Carballo 2008, Singh 2008, Franke 2010, van Rooij 2007 among many others). As Chemla (2010) points out, most of the solutions proposed are based on considerations about the plausibility of the conditional inferences, regardless of how they are derived in the first place. So plugging in one of these solutions to the present system, we can also derive the non-conditional inferences where needed.

¹⁴ It is also assumed that exhaustification of each member is restricted by (26) above, hence that generally applies only to the ones where (26) is not violated. So to be precise, in (31b) the positive member should not be exhaustified, as exhaustification is vacuous in that position, hence it violates (26). This does not make a difference of course for the predicted inference that it is raining.

Let's now turn to cases of non-projection like (13b) above. As we saw already, the way to account for defeasibility in this system is by giving non-global scope to EXH.¹⁵ Global exhaustification in fact in this case would lead to the projection of the inference that John participated, which is incompatible with the given context and thus cannot be the choice in this case.^{16,17}

(33) EXH[¬[John won] or he is upset for other reasons]

In this case there are two other non-global options: exhaustification above negation within the first disjunct as in (34) and exhaustification within the first disjunct below negation as in (35). Both of them lead to a meaning that does not entail that John participated, hence compatible with the given context.^{18,19}

(34) [EXH¬[John won] or he is upset for other reasons]

(35) [¬EXH[John won] or he is upset for other reasons]

15 Remember that I am assuming that the alternatives of soft triggers are always active and hence must always be exhaustified somewhere.

16 The way the inference is obtained is by excluding the alternative ¬[John participated], which is in turn obtained by combining the alternative of the disjunction (replacing the disjunction with one of the disjuncts) and the alternative of the soft trigger (replacing [John won] with [John participated]). In greater detail, the alternatives are the ones below, with the relevant alternative in blue.

$$\begin{aligned}
 (1) \quad & \text{EXH}(\neg(\mathbf{win}(j)) \vee q) \\
 (2) \quad \mathcal{Alt} = & \left\{ \begin{array}{l} \neg \mathbf{win}(j) \vee q \\ q \\ \neg \mathbf{win}(j) \\ \neg \mathbf{participated}(j) \\ \neg \mathbf{participated}(j) \vee q \\ \neg \mathbf{win}(j) \wedge q \\ \neg \mathbf{participated}(j) \wedge q \end{array} \right\}, \mathcal{Excl} = \left\{ \begin{array}{l} \neg \mathbf{participated}(j) \\ \neg \mathbf{win}(j) \wedge q \\ \neg \mathbf{participated}(j) \wedge q \end{array} \right\} \\
 & \text{EXH}(\neg \mathbf{win}(j) \vee q) = (\neg \mathbf{win}(j) \vee q) \wedge \mathbf{participated}(j) \wedge (\neg q \vee \mathbf{win}(j)) \wedge (\neg q \vee \mathbf{participated}(j))
 \end{aligned}$$

Notice also that here the notion of innocent exclusion is needed; see fn. 10 above. In particular the alternative that would be problematic if it were to be excludable is (¬**participated**(j) ∨ q) because the exclusion of this would entail ¬q, i.e. that John is not upset. As one can verify, the problematic alternative is not innocently excludable.

17 Notice that as discussed at the beginning of this section, global exhaustification does not always lead to projection of a soft presupposition of its disjuncts, but sometimes it is vacuous and what is predicted is the conditional entailments discussed above.

18 Notice that exhaustification below negation violates (26), so everything being equal (35) will be dispreferred.

19 The meaning obtained when exhaustification is above negation is that either John participated but didn't win or that he is upset for other reasons. As it is easy to verify, this does not entail that he participated.

Summing up, the present system can account for a case like (13b), where the soft presupposition does not project, simply as a case of non-global scope of the exhaustivity operator EXH. Let's turn now to the case of conditionals.

3.2.2 Conditionals

Defeasibility in Antecedents and Projection out of the Consequents Conditionals present a similar set of data. In the case of a soft trigger embedded in the consequent like (12a) above, the conditional inference that if John wasn't sick he participated in the marathon is predicted. In the same way as in the case of disjunction above, we can rely on a solution of the proviso problem and obtain the non-conditional inference that he participated in the marathon.

The cases of suspension of the presupposition when the soft trigger appears in the antecedent like (14b) above can be analyzed as cases of local scope of EXH, again in the same way as disjunction above.

- (36) a. I don't know whether John participated in the Boston Marathon. But if EXH(he won), he is certainly celebrating right now.

So we have a way to derive the defeasibility of soft presuppositions in the antecedent and the projection out of the scope of conditionals. There remains to be accounted for how soft presuppositions can project out of conditionals' antecedents in certain cases.

Projection out of Antecedents As we will see in this section, if we combine this system with a material implication analysis of conditionals, we can account for the cases of projection of the presupposition from the antecedent, but we also make incorrect predictions. I will show that this is also a prediction with 'regular' scalar implicatures, so we need a solution independently.

The problem with material implication can be seen in the following cases both with soft presuppositions and scalar implicatures: for (37a) for instance we get the right prediction that Jane participated, but we also wrongly obtain the inference that she isn't celebrating right now. Similarly for (38a) we get the prediction that John corrected some of the assignment but also that he will not go out tonight, which again seems wrong.

- (37) a. If Jane won, she is celebrating right now
 b. Jane participated and she isn't celebrating right now
 c. $\mathcal{Alt} = \left\{ \begin{array}{l} \mathbf{won}(j) \rightarrow \mathbf{celebrate}(j) \\ \mathbf{participate}(j) \rightarrow \mathbf{celebrate}(j) \end{array} \right\}$
 $\mathcal{Excl} = \{\mathbf{participate}(j) \rightarrow \mathbf{celebrate}(j)\}$

- d. $\text{EXH}(\mathbf{won}(j) \rightarrow \mathbf{celebrate}(j)) =$
 $(\mathbf{won}(j) \rightarrow \mathbf{celebrate}(j)) \wedge (\mathbf{participate}(j) \wedge \neg \mathbf{celebrate}(j))$
- (38) a. If John corrected all of the assignments, he will go out tonight.
 b. John corrected some of the assignments and he won't go out tonight.
- c. $\mathcal{Alt} = \left\{ \begin{array}{l} \mathbf{all} \rightarrow q \\ \mathbf{some} \rightarrow q \end{array} \right\}, \mathcal{Excl} = \{\mathbf{some} \rightarrow q\}$
- d. $\text{EXH}(\mathbf{all} \rightarrow q) = (\mathbf{all} \rightarrow q) \wedge (\mathbf{some} \wedge \neg q)$

If we move to a different theory of conditionals, like strict implication, we do not make this incorrect prediction anymore. In fact, we only predicts that it is possible that Jane participated but that she is not celebrating right now.

- (39) a. If Jane won, she is celebrating right now.
- b. $\mathcal{Alt} = \left\{ \begin{array}{l} \Box[\mathbf{won}(j) \rightarrow \mathbf{celebrate}(j)] \\ \Box[\mathbf{participate}(j) \rightarrow \mathbf{celebrate}(j)] \end{array} \right\}$
 $\mathcal{Excl} = \{\Box[\mathbf{participate}(j) \rightarrow \mathbf{celebrate}(j)]\}$
- c. $\text{EXH}(\Box[\mathbf{won}(j) \rightarrow \mathbf{celebrate}(j)]) =$
 $(\Box[\mathbf{won}(j) \rightarrow \mathbf{celebrate}(j)]) \wedge (\Diamond[\mathbf{participate}(j) \wedge \neg \mathbf{celebrate}(j)])$

Furthermore, it is easy to see that (39c) is equivalent to (40), in other words that it is possible that Jane participated and *did not win* and that she is not celebrating right now. I take this to be a plausible optional inference for the conditional cases.²⁰

- (40) $\Box[\mathbf{won}(j) \rightarrow \mathbf{celebrate}(j)] \wedge \Diamond[(\mathbf{participate}(j) \wedge \neg \mathbf{won}(j)) \wedge \neg \mathbf{celebrate}(j)]$

So the problematic prediction is not made anymore, but notice that the projection out of the antecedent is now weakened: we only get that *it's possible* that Jane participated, which seems too weak, at least in some cases. In the following, I will sketch a solution introducing new alternatives for conditionals, along the lines of disjunction. Assume a static version of von Stechow's (1999) semantics of conditionals: strict implication plus the (hard) presupposition of compatibility in the modal base, represented schematically in (41).²¹

- (41) $\lambda p \lambda q : \Diamond p. \Box[p \rightarrow q]$

²⁰ It is optional because there is always the other possible local scope for EXH that would not lead to any inference at all.

²¹ Here I am using Heim & Kratzer's (1998) notation and represent the presupposition between the colon and the dot in the lambda expression.

Let me propose that conditionals, like disjunctions, also introduce alternatives. In particular they introduce the alternatives in (42).²²

$$(42) \quad \mathcal{Alt} = \{ \Box[p \rightarrow q], \Diamond\neg p, \Diamond q, \Diamond\neg q \}$$

One can show that in simple cases, where no scalar item appears in the antecedent, none of the three alternatives is excludable, hence exhaustification is predicted to be vacuous.²³ On the other hand, if we go back to the crucial case of a scalar item embedded in the antecedent, we now have more alternatives and exhaustifying the sentence with respect to them gives rise to the right prediction – in this case that Jane participated.²⁴

(43) a. If Jane won, she is celebrating right now.

$$b. \mathcal{Alt} = \left\{ \begin{array}{l} \Box[\mathbf{won}(j) \rightarrow \mathbf{celebrate}(j)] \\ \Box[\mathbf{participate}(j) \rightarrow \mathbf{celebrate}(j)] \\ \Diamond\neg\mathbf{won}(j) \\ \Diamond\neg\mathbf{participate}(j) \\ \Diamond\neg\mathbf{celebrate}(j) \\ \Diamond\mathbf{celebrate}(j) \end{array} \right\}$$

$$\mathcal{Excl} = \{ \Diamond\neg\mathbf{participate}(j) \}$$

$$c. \text{EXH}(\Box[\mathbf{won}(j) \rightarrow \mathbf{celebrate}(j)]) = \Box[\mathbf{won}(j) \rightarrow \mathbf{celebrate}(j)] \wedge \neg\Diamond\neg\mathbf{participate}(j)$$

Again, the present system makes the very same predictions for scalar implicatures coming from the strongest elements of the scale. In other words, it predicts that (44b) can be an inference of (44a). I believe this is a welcome prediction. See again Chemla 2008 for discussion.

(44) a. If John failed all of his students, the dean will be upset.

b. John failed some of his students.

Summing up, the present system can account both for when the inference of a scalar item projects from the antecedent of a conditional and when it does not.

²² These alternatives are of course not determined in the same way as above, as conditionals are not soft triggers. Where do they come from then? I will leave this open for now, but one direction I am exploring is that the alternatives of conditionals posited here are precisely what Gazdar (1979) proposes to be implicatures of conditionals (what he calls “clausal implicatures”). The only difference is that among the alternatives $\Diamond p$, which is a presupposition of the conditional. The hope is that a theory of clausal implicatures will independently motivate the alternatives here.

²³ Here again the notion of innocent exclusion is needed; see footnote 6 and Fox (2007).

²⁴ More precisely, we obtain that it is true that Jane participated in all worlds in the relevant modal base, which I take to be epistemic in these cases. I leave for further research to examine the predictions for cases of non-epistemic conditionals.

3.3 Summing up

We can account both for the cases in which soft presuppositions project and for the cases in which they do not, just as a matter of scope of the exhaustivity operator. The assumption is that the latter can be inserted at any scope position in accordance with (26) and compatibility in the context of the inferences that it gives rise to. So, we predict the pattern that motivates the soft-hard distinction. Let's turn now to a further consequence of the present account.

4 Interactions with Other Scalar Implicatures

The interaction between presuppositions and scalar implicatures has been recently discussed by Chierchia (2004), Simons (2006), Russell (2006), Chemla (2010) and Gajewski & Sharvit (to appear). Chierchia (2004) discusses the case in (45a) in which a scalar implicature is apparently computed on the presupposition that is accommodated.²⁵

- (45) a. John knows that some of the students are waiting for him.
 b. \rightsquigarrow Some but not all of the students are waiting for John.

One way to account for the inference above in the present system is by globally exhaustifying the sentence with respect to the combined alternatives of the factive predicate and the ones of the scalar item *some*. In fact, abbreviating (45a) as in (46a), the alternatives are the ones in (46b) and crucially *all of the students are waiting for John* (p_{\forall}) is among the excludable ones, hence we get the prediction that its negation is among the implicatures of the sentence. In other words, that it's not the case that all students are waiting for John.

- (46) a. $\mathbf{know}_j p_{\exists}$
 b. $\mathcal{Alt} = \left\{ \begin{array}{l} \mathbf{know}_j p_{\exists} \\ \mathbf{know}_j p_{\forall} \\ p_{\forall} \\ p_{\exists} \end{array} \right\}, \mathcal{Excl} = \{ \mathbf{know}_j p_{\forall}, p_{\forall} \}$
 c. $\text{EXH}(\mathbf{know}_j p_{\exists}) = \mathbf{know}_j p_{\exists} \wedge \neg \mathbf{know}_j p_{\forall} \wedge \neg p_{\forall}$

So we can account for some simple cases of the interaction between soft presuppositions and scalar implicatures. Recently, Simons (2006) has pointed out two challenging cases for all theories of scalar implicatures. I will show that in the present system these cases can simply be treated as cases of multiple scalar items.

²⁵ Chierchia (2004) uses it as an argument in favor of local application of scalar implicatures, which we can of course reproduce here as local application of EXH. In the following cases I focus on the global application of EXH.

4.1 Two puzzling cases

4.1.1 Sorry

The first case is one in which a scalar item is embedded in the scope of an emotive factive like *sorry*. The relevant reading can be informally described as one in which there is an implicature at the presuppositional level, as John believes that some but not all of the students failed the exam, but there is no scalar implicature at the assertion level, as there is no implication that he is sorry that not all of the students failed the exam.

- (47) a. John is sorry that some of the students failed the exam.
 b. \rightsquigarrow John believes that some but not all of the students failed the exam.
 c. $\not\rightsquigarrow$ John is sorry that some but not all of the students failed the exam.

Let's first assume the following lexical entry for *sorry*, modeled on Gajewski & Sharvit (to appear), where x is *sorry that* p simply means that x believes that p and that p is the case and that x does not want it. Also, along the lines of the other soft triggers above, I will assume the alternatives in 48b.²⁶

- (48) a. $\llbracket \text{sorry} \rrbracket = \lambda p \lambda x \lambda w [\mathbf{want}_{x,w} \neg p \wedge \mathbf{believe}_{x,w} p \wedge p_w]$
 b. $\mathcal{Alt} = \left\{ \begin{array}{l} \lambda p \lambda x \lambda w [\mathbf{want}_{x,w} \neg p \wedge \mathbf{believe}_{x,w} p \wedge p_w] \\ \lambda p \lambda x \lambda w [\mathbf{believe}_{x,w} p] \\ \lambda p \lambda x \lambda w [p_w] \end{array} \right\}$

Going back to (47a), which we can schematize as in (49a), we get the alternatives in (49b) and the result of exhaustification leads precisely to the correct result that John believes that some of the students failed the exam and he doesn't believe that all of them did, but crucially not that he is sorry that not all of the students failed the exam. In fact once we exclude p_{\forall} and $\mathbf{believe}_j p_{\forall}$, the exclusion of the other one ($\neg \mathbf{believe}_j p_{\forall} \vee \neg p_{\forall} \vee \neg \mathbf{want}_j \neg p_{\forall}$) is already entailed, hence there are no further inferences predicted.²⁷

- (49) a. $\mathbf{believe}_j p_{\exists} \wedge p_{\exists} \wedge \mathbf{want}_j \neg p_{\exists}$

²⁶ Again, as one can verify, these are the ones predicted by applying Abrusán's (2011) algorithm.

²⁷ Notice that the inference predicted is that it is not the case that John believes that all, with negation taking wide scope. In some cases we might want to obtain the stronger inference in which negation takes narrow scope, i.e. John believes that not all. There have been various proposals on how to strengthen the weak inference to the stronger one; see Russell 2006 and Simons 2006 among others. I will remain neutral at this point on how to do this. Thanks to Michael Franke (p.c.) for discussion on this point.

$$\begin{aligned}
\text{b. } \mathcal{Alt} &= \left\{ \begin{array}{l} p_{\exists} p_{\forall} \\ \mathbf{believe}_j p_{\exists} \\ \mathbf{believe}_j p_{\forall} \\ \mathbf{believe}_j p_{\exists} \wedge p_{\exists} \wedge \mathbf{want}_{j \neg} p_{\exists} \\ \mathbf{believe}_j p_{\forall} \wedge p_{\forall} \wedge \\ \mathbf{want}_{j \neg} p_{\forall} \end{array} \right\}, \mathcal{Excl} = \left\{ \begin{array}{l} p_{\forall} \\ \mathbf{believe}_j p_{\forall} \\ \mathbf{believe}_j p_{\forall} \wedge p_{\forall} \wedge \mathbf{want}_{j \neg} p_{\forall} \end{array} \right\} \\
\text{c. EXH}(\mathbf{believe}_j p_{\exists} \wedge p_{\exists} \wedge \mathbf{want}_{j \neg} p_{\exists}) &= (\mathbf{believe}_j p_{\exists} \wedge p_{\exists} \wedge \mathbf{want}_{j \neg} p_{\exists}) \wedge \neg p_{\forall} \wedge \\
&\quad \neg \mathbf{believe}_j p_{\forall}
\end{aligned}$$

4.1.2 Discover

The second case is a scalar item in the scope of a factive like *discover*. Here the relevant reading is one in which John believes that some and possibly all of the students failed the exam, but the inference that the complement is true comes with the scalar implicature that not all of the students did in fact fail the exam.

- (50) a. John discovered that some of the students failed the exam.
 b. \nrightarrow John believes that some but not all of the students failed the exam.
 c. \rightsquigarrow some but not all of the students failed the exam.

The strategy for treating this case is similar to the one above. Consider the entry in (51a) and the alternatives in (51b), where *x discovered that p* simply means that *x* did not believe that *p* for some time before the utterance time and that *x* now believes it and that *p* is also the case.

- (51) a. $\llbracket \text{discover} \rrbracket = \text{for some salient interval } t' \text{ such that } t' < t$
 $\lambda p \lambda x \lambda t [\neg \mathbf{believe}_{x,t'} p \wedge \mathbf{believe}_{x,t} p \wedge p_t]$
 b. $\mathcal{Alt} = \left\{ \begin{array}{l} \lambda p \lambda x \lambda t [\neg \mathbf{believe}_{x,t'} p \wedge \mathbf{believe}_{x,t} p \wedge p_t] \\ \lambda p \lambda x \lambda t [\neg \mathbf{believe}_{x,t'} p] \\ \lambda p \lambda x \lambda t [p_t] \end{array} \right\}$

Let's go back now to the case above in (50a) represented schematically in (52a). Once we apply the lexical entry in (51a) with respect to the alternatives in (51b), we obtain the correct result: in fact we only obtain the implicature that some but not all of the students failed the exam. Again, once we exclude p_{\forall}^t the exclusion of the other ($\mathbf{believe}_{j,t'} p_{\forall} \vee \neg \mathbf{believe}_{x,t} p_{\forall} \vee \neg p_{\forall}^t$) is already entailed.

- (52) a. $\neg \mathbf{believe}_{j,t'} p_{\exists} \wedge \mathbf{believe}_{x,t} p_{\exists} \wedge p_{\exists}^t$

$$\begin{aligned}
 & \text{b. } \left\{ \begin{array}{l} p_{\exists}^t \\ p_{\forall}^t \\ \neg \text{believe}_{j,t'} p_{\exists} \\ \neg \text{believe}_{j,t'} p_{\forall} \\ \neg \text{believe}_{j,t'} p_{\forall} \wedge \text{believe}_{x,t} p_{\forall} \wedge p_{\forall}^t \\ \neg \text{believe}_{j,t'} p_{\exists} \wedge \text{believe}_{x,t} p_{\exists} \wedge p_{\exists}^t \end{array} \right\} \mathcal{E}xcl = \left\{ \begin{array}{l} p_{\forall}^t \\ \neg \text{believe}_{j,t'} p_{\forall} \wedge \text{believe}_{x,t} p_{\forall} \wedge p_{\forall}^t \end{array} \right\} \\
 & \text{c. } EXH(\neg \text{believe}_{j,t'} p_{\exists} \wedge \text{believe}_{x,t} p_{\exists} \wedge p_{\exists}^t) = \\
 & \quad (\neg \text{believe}_{j,t'} p_{\exists} \wedge \text{believe}_{x,t} p_{\exists} \wedge p_{\exists}^t) \wedge \neg p_{\forall}^t
 \end{aligned}$$

Summing up, we predict two of the most puzzling cases of the interaction between presuppositions and scalar implicatures as simple cases of multiple scalar items.²⁸

5 Conclusions

In the present paper I have argued that soft presuppositions are actually plain entailments in some cases and scalar implicatures in others. I have proposed to derive this by treating soft presuppositions as entailments that are also alternatives of soft triggers. As described above, this can explain how soft presuppositions can be suspended, while also accounting for the apparent projection behavior when they are not. Furthermore, it can also account for puzzling cases of the interaction between soft presuppositions and “regular” scalar implicatures. I have also sketched how a theory of the triggering problem can be integrated to account for the alternatives used in the present system. So the anomalous behavior of soft triggers can be derived given only an independently motivated theory of scalar implicatures.

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²⁸ Gajewski & Sharvit (to appear) can also account for it but they propose that scalar implicatures should also be computed at the presuppositional level. Here, instead, I avoid this complication of the system. Chemla (2010) can also account for cases of interactions between presuppositions and scalar implicatures in his system. I leave a detailed comparison of his system and mine with respect to these and other cases for future research.

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Linguistics.

Jacopo Romoli
309 Boylston Hall
Department of Linguistics
Harvard University
Cambridge, 02138 MA
jromoli@fas.harvard.edu